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Hydrology and Earth System Sciences
Discussions

Interactive comment on "A High-Resolution Dataset of Water Fluxes and States for Germany Accounting for Parametric Uncertainty" *by* Matthias Zink et al.

Anonymous Referee #1

Received and published: 11 November 2016

Review of HESS-2016-443 "A High-Resolution Dataset of Water Fluxes and States for Germany Accounting for Parametric Uncertainty"

Overall:

This paper provides an excellent and useful product, and the complexities and methods used to derive this product. There are some minor organizational and grammatical errors, but overall I think this paper is a good contribution to broad-scale hydrologic modeling and analysis.

The paper could benefit from some additional attention to organization, specifically in the introductory sections. The authors limit themselves in the stated aim of the

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Discussion paper

paper in the introduction, and go on to state other aims later in the paper. The aim as stated in the introduction is “to derive a consistent set of national-scale hydrologic data for Germany at high spatial and temporal resolutions”. If this was the extent of the paper, I would recommend that this be re-submitted as a methods paper; however, the authors go on to append additional aims/goals in the body of the paper which go beyond this, such as: Page 5, line 22: “to derived consistent model parameters to perform nationwide simulations of water fluxes and states.” Page 7, line 8: “to analyze the temporal dynamics of soil moisture” Page 13, line 21: “spatio-temporal differences of uncertainties caused by the 100 ensemble parameter sets” As it is written, this paper reads as an aggregation of papers instead of one cohesive contribution. This could be easily fixed by restating the aim in the introduction to include all the parametric uncertainty analyses that are presented in the paper. Please gather and reassess the purpose and scope of the entire paper’s contribution to the field of hydrologic science, and state this in the introduction. There are also several spots in the paper which could be improved by directly assessing the limitations of the data or analyses. An example of where this is done well in the paper is page 7, lines 7-8: “A direct comparison between observed and simulated soil moisture may therefore be misleading due to differences in spatial representativeness and sampling depth.”

Specific comments:

Page 1, line 24: formatting of the citation does not match others. Page 2, line 6: state limitations of using observational data. Page 2, line 9: add “contiguous’ or ‘continental’ United States. Page 2, line 13-14: grammar. “. . . who stated a need for higher-resolution spatial data and models. . . “ Page 3, line 11: add ‘entirely’, “only catchment entirely covered by German territory” Page 3, line 17: grammar, “average discharge of the seven catchments ranges” Page 4, line 1-2: how does this assumption of static land cover before 1990 impact results? Page 4, line 2: what are your aggregation/resampling methods? Page 4, line 4: remove ‘information’ after ‘gauging station’ Page 4, line 7: what are the relative characteristics of the 222 catchments?

Size? Is there a map? Page 4, line 18: authors state that this spatial resolution is appropriate without additional reasoning or citation. Please provide one or both. Page 5, line 3: change 'precipitation' to 'rainfall'. Page 5, line 6: "On average, it is 1.8 m deep in Germany." Given the previous sentence this is confusing. What is the 'it' in this sentence? Page 5, line 11: since Germany is a part of Europe, "various river basins across Europe (including Germany), and the USA. . ." Page 5, line 14: remove 'the' before porosity. Page 5, line 22: this goal is not included in the introductory aim. Page 7, line 8-9: this aim is not included in the introduction. Page 8, line 1-2: mean and standard deviation symbols defined in line 1, just use symbols in following sentence. Page 8, line 25: choose Basins or Catchments and be consistent. I would recommend Basins, which would require going back and changing this throughout the paper. Page 8-9; this section could benefit from more organization, such as the use of a more explicit introductory paragraph. Presentation jumps from analysis of results overall to specific basins, which is difficult to follow. Page 9, line 26: remove 'is' at the end of the sentence. Page 10, lines 16-24: You discuss the energy- and water-limited conditions, which could also be added to the figure. It also appears that at this point the data switch from under representation to over representation (within the uncertainty bounds). Please discuss this. Page 11, line 5: your data groupings get confusing here. In the figure daily and monthly (I think?) data are grouped by color in seasons. In the table you report monthly and daily values. Be explicitly clear about what is being reported here. Maybe have a different symbol for monthly and daily data to differentiate (if they are both in the scatterplots. . . still not clear.). Page 11, line 6: "The results of the scatter plot. . . indicate. . ." this phrasing is awkward. Consider "The scatterplots shown in Figure 5 indicate. . ." Page 11, lines 17-23: add 'limitations' before Hargreaves-Samani approach to improve clarity of the paragraph. Page 11, line 24-page 12 line 2: does land cover type play a role in the ability to interpolate point to grid data? Are some land cover types likely to be more spatially heterogenous with respect to ET and soil moisture? Could this be incorporated into an uncertainty analysis? Page 12, line 11: these features (Central Uplands, Alps) are not on the map.

Tables:

Capitalize all headers, to be consistent (Table 1 no headers are capitalized, Table 2 some are, some aren't. Table 1. Header for Major German Basins Table 2. Describe RMSE, BIAS and in a footnote, and what "[-]" means in a footnote or caption. "Station-name" should be two words.

Figures:

Figure 1: what do colors represent? Please describe in figure caption. Figure 4: using the same color scale is a little misleading. Include the locations of the eddy covariance stations on the map. Figure 5: consider changing symbols so that this figure is readable in black and white. Figure 6: why are these four stations selected? Figure 7: the Central Uplands and Alps (referenced on page 12, line 11) are not explicitly shown on this map.

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